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Momentum can be found by multiplying the mass of an object by its...

...velocity.



Row 1, Col 1

A force exerted over a period of time which changes an object's momentum is called...

...Impulse.





p=mv p=(7kg)(15m/s)=105 kg·m/s



1,3

FOR THE SAME FORCE, WHY IS THE SPEED OF A CANNONBALL GREATER WHEN SHOT FROM A CANNON WITH A LONGER BARREL?

Longer time for the force to act on the cannonball.



A 1000 kg car moving at 12 m/s slows down to a velocity of 5 m/s. What is the car's change in momentum? Impulse?

 $\Delta p = m \Delta v$ $\Delta p = (1000 \text{ kg}) (5 \text{ m/s} - 12 \text{ m/s})$ $\Delta p = (1000 \text{ kg}) (-7 \text{ m/s})$ $\Delta p = -7000 \text{ kg} \cdot \text{m/s}$



A gun is fired. Compared to the impulse on the bullet, the amount of impulse on the gun is...

...the same. $\mathbf{F} \cdot \mathbf{t} = \mathbf{F} \cdot \mathbf{t}$



2,2

A car experienced a change in momentum of 5kgm/s in 0.2 seconds. What force acted on the car?

$$Ft = \Delta p$$

$$F = \Delta p/t$$

$$F = (5kg \cdot m/s)/(0.2s) = 25N$$



Two cars of the same mass (both having a mass of 2.0 kg) collide and stick together. If the first object was moving at a velocity of 5.0 m/s and the second object was at rest before the collision, what is the velocity of the two cars after the collision?

 $m_1v_1+m_2v_2=(m_1+m_2)v'$ (2.0kg)(5.0m/s)+(2.0kg)(0m/s)=(4.0kg)v' v'=2.5m/s



True or False: If the momentum of an object is changing, then that object most likely is experiencing a change in velocity.

True



What is the difference between impact and impulse?

The impact is the force. The impulse is the force multiplied by time.



Which has a greater momentum: a 2kg object moving 5m/s East or a 10kg object moving 1m/s East?

The momentums are the same: $p_1=(2kg)(5m/s)=10 \text{ kg}\cdot\text{m/s}$ $p_2=(10kg)(1m/s)=10 \text{ kg}\cdot\text{m/s}$



True or False: If an object is moving with constant velocity, then the object has no net force acting on it.

True





If the mass of a 1kg car is doubled, then the momentum of the cart is now...

Doubled. $p=(1kg)\vec{v}$ $p=(2\cdot 1kg)\vec{v}$ makes p twice as large.



A bug hits a car windshield. Which experiences more force: the bug or the car?

The forces are the same.



An 8kg cart has a force of 14N acting on it to bring the cart to a stop in 4 seconds. What is the change in velocity of the cart?

 $F \cdot t = m \cdot \Delta \vec{v}$ $(14N)(4s) = (8kg) \Delta \vec{v}$ $\Delta \vec{v} = 7m/s$



True or False: Objects change velocity only when a net force is exerted on them for some amount of time.

True.





A large truck crashes into a small sedan. Which experiences a greater change in momentum?

Change in momentum is the same. $\mathbf{m}_{truck}\Delta \mathbf{\vec{v}} = \mathbf{m}_{sedan}\Delta \mathbf{\vec{V}}$



When the time causing an object to change its momentum is extended, does the force increase or decrease?



A train car with a mass of 50kg is moving 16m/s. It hits another train car of equal mass, which is at rest, in an inelastic collision. What is the final velocity of the two train cars?

 $m_1v_1+m_2v_2=(m_1+m_2)v'$ (50kg)(16m/s)+(50kg)(0m/s)=(100kg)v' v'=8m/s



True or False: A bug hitting your forehead experiences a greater force than your forehead.

FALSE.

Two objects colliding will experience the same force!

